

Inventors: Robert C. Greczanik et al.
Docket No.: MDYNE/Z061US

CLAIMS

Having thus described the invention, we claim:

1. A method for reinforcing an end of a metal tube, said method comprising the steps of:
 - a) providing an elongated tube having a substantially uniform wall thickness, said tube having inner and outer surfaces and first and second ends;
 - b) providing a die defining a cavity conforming to the outer surface of said tube;
 - c) placing said tube in said die cavity such that a length of said first end extends beyond said die cavity;
 - d) preventing movement of the tube longitudinally with respect to said die cavity;
 - e) providing a mandrel having a first portion adapted to fit within said tube through said first end and a second portion extending radially from said mandrel first portion having a tube deforming recess surface adapted to impinge upon said first end;
 - f) inserting said mandrel first portion into said first end until said tube deforming surface contacts said first end; and
 - g) advancing said mandrel under pressure thereby causing cold deformation of said first end, without creating a fold therein, and plastically deforming said first end within said mandrel recess thereby creating an integral, reinforced lip at said first end.
2. The method of claim 1, wherein during step c, said length of said first end extending beyond said die cavity is less than or equal to two times the wall thickness of said tube.

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3. The method of claim 2 wherein said mandrel first portion conforms to the inner surface of said tube.
4. The method of claim 2 wherein said tube has a circular cross section.
5. The method of claim 2 wherein said tube has a rectangular cross section.
6. The method of claim 2 wherein said tube comprises a hitch bar receiver tube.
7. A method for forming an elongated receiver tube for a motor vehicle trailer hitch assembly of the type wherein said receiver tube has a hollow interior passage that receives a hitch bar, said method comprising the steps of:
 - a) providing an elongated tube having a substantially uniform wall thickness, said tube having inner and outer surfaces and first and second ends;
 - b) providing a die defining a cavity conforming to the outer surface of said tube;
 - c) placing said tube in said die cavity such that a length of said first end extends beyond said die cavity, said length being less than or equal to two times the wall thickness of said tube;
 - d) preventing movement of the tube longitudinally with respect to said die cavity;

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- e) providing a mandrel having a first portion adapted to fit within said tube through said first end and a second portion extending radially from said mandrel first portion having a tube deforming recess surface adapted to impinge upon said first end;
 - f) inserting said mandrel first portion into said first end until said tube deforming surface contacts said first end; and
 - g) advancing said mandrel under pressure thereby causing cold deformation of said first end, without creating a fold therein, and plastically deforming said first end within said mandrel recess thereby creating an integral, reinforced lip at said first end.
8. The method of claim 7 wherein said mandrel first portion conforms to the inner surface of said tube.
9. The method of claim 7 wherein said tube has a circular cross section.
10. The method of claim 7 wherein said tube has a rectangular cross section.
11. An elongated receiver tube for a motor vehicle trailer hitch assembly, said receiver tube comprising:
- a) an elongated hollow tube having first and second ends and a substantially uniform wall thickness; and

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- b) a lip extending radially-outwardly from said first end, said lip integrally formed with said hollow tube without folding said first end.
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- 12. The receiver tube of claim 11, wherein said lip is integrally formed with said tube through the plastic deformation of a length of said first end wherein said deformable length is less than or equal to two times the wall thickness of said tube.
 - 13. The receiver tube of claim 11, wherein said elongated hollow tube has a circular cross-section.
 - 14. The receiver tube of claim 11, wherein said elongated hollow tube has a rectangular cross-section.